AS/NZS 4024.1204:2019

Australian/New Zealand Standard™

Safety of machinery — Electrical equipment of machines

Part 1204: General requirements (IEC 60204-1:2016 (ED. 6.0) MOD)

STANDARDS Australia

STANDARDS NEW ZEALAND
PAEREWA AOTEAROA

AS/NZS 4024.1204:2019

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The following are represented on Committee SF-041:

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Australian Industry Group
Australian Institute for Health and Safety
Australian Manufacturing Technology Institute
Australian Manufacturing Workers' Union
Australian Packaging and Processing Machinery Association
Engineers Australia
Human Factors and Ergonomics Society of Australia
New Zealand Safety Council
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Australian/New Zealand Standard™

Safety of machinery — Electrical equipment of machines

Part 1204: General requirements (IEC 60204-1:2016 (ED. 6.0) MOD)

Originated as AS 1543—1985.
Revised and redesignated AS 60204.1—2005.
Jointly revised and redesignated as AS/NZS 4024.1204:2019.

Preface

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee SF-041, Safety of Machinery, to supersede AS 60204.1—2005, *Safety of machinery — Electrical equipment of machines, Part 1: General requirements (IEC 60204-1, Ed. 5 (FDIS) MOD)*.

After consultation with stakeholders in both countries, Standards Australia and Standards New Zealand decided to adopt this Standard as an Australian/New Zealand Standard.

The objective of this Standard is to provide requirements and recommendations relating to the safety of electrical, electronic and programmable electronic equipment and systems to machines not portable by hand while working, including a group of machines working together in a coordinated manner. The equipment covered by this part of AS/NZS 4024 commences at the point of connection of the supply to the electrical equipment of the machine.

This part of AS/NZS 4024 does not cover all the requirements (for example, guarding, interlocking and control) that are needed or required by other parts of AS/NZS 4024 and regulations in order to protect persons from hazards other than electrical hazards. Each type of machine has unique requirements to be accommodated to provide adequate safety.

This Standard is an adoption with national modifications, and has been reproduced from, IEC 60204-1:2016, *Safety of machinery — Electrical equipment of machines — Part 1: General requirements.* The modifications are additional requirements and are set out in Appendix ZZ, which has been added at the end of the source text.

Appendix ZZ lists the variations to IEC 60204-1:2016 for the application of this Standard in Australia and New Zealand.

As this document has been reproduced from an International Standard, the following applies:

(a) In the source text “this part of IEC 60204” should read “this Australian/New Zealand Standard”;

(b) A full point substitutes for a comma when referring to a decimal marker.

Australian or Australian/New Zealand Standards that are identical adoptions of international normative references may be used interchangeably. Refer to the online catalogue for information on specific.

The terms “normative” and “informative” are used in Standards to define the application of the appendices or annexes to which they apply. A “normative” appendix or annex is an integral part of a Standard, whereas an “informative” appendix or annex is only for information and guidance.

NOTES

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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SAFETY OF MACHINERY – ELECTRICAL EQUIPMENT OF MACHINES –

Part 1: General requirements

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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8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 60204-1 has been prepared by IEC technical committee 44: Safety of machinery – Electrotechnical aspects.

This sixth edition cancels and replaces the fifth edition published in 2005. It constitutes a technical revision.

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

a) added requirements to address applications involving power drive systems (PDS);
b) revised electromagnetic compatibility (EMC) requirements;
c) clarified overcurrent protection requirements;
d) requirements for determination of the short circuit current rating of the electrical equipment;

e) revised protective bonding requirements and terminology;

f) reorganization and revision to Clause 9, including requirements pertaining to safe torque off of PDS, emergency stop, and control circuit protection;

g) revised symbols for actuators of control devices;

h) revised technical documentation requirements;

i) general updating to current special national conditions, normative standards, and bibliographical references.

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

FDIS	Report on voting
44/765/FDIS	44/771/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 in the IEC 60204 series, published under the general title *Safety of machinery – Electrical equipment of machines*, can be found on the IEC website.

The following differing practices of a less permanent nature exist in the countries indicated below.

4.3.1: The voltage characteristics of electricity supplied by public distribution systems in Europe are given in EN 50160:2010.

5.1: Exception is not allowed (USA).

5.1: TN-C systems are not permitted in low-voltage installations in buildings (Norway).

5.2: Terminals for the connection of the protective earthing conductors may be identified by the colour green, the letters “G” or “GR” or “GRD” or “GND”, or the word “ground” or “grounding”, or with the graphical symbol IEC 60417-5019:2006-08 or any combination (USA).

6.3.3 b), 13.4.5 b), 18.2.1: TT power systems are not allowed (USA).

6.3.3, 18.2, Annex A: TN systems are not used. TT systems are the national standard (Japan).

6.3.3 b): The use of residual current protective devices with a rated residual operating current not exceeding 1 A is mandatory in TT systems as a means for fault protection by automatic disconnection of supply (Italy).

7.2.3: Disconnection of the neutral conductor is mandatory in a TN-S system (France and Norway).

7.2.3: Third paragraph: distribution of a neutral conductor with an IT system is not allowed (USA and Norway).

7.10: For evaluation of short circuit ratings the requirements of UL 508A Supplement SB, may be used (USA).

8.2.2: See IEC 60364-5-54:2011, Annex E List of notes concerning certain countries.

9.1.2: Maximum nominal AC control circuit voltage is 120 V (USA).

12.2: Only stranded conductors are allowed on machines, except for 0,2 mm^2 solid conductors within enclosures (USA).

12.2: The smallest power circuit conductor allowed on machines is 0,82 mm^2 (AWG 18) in multiconductor cables or in enclosures (USA).

Table 5: Cross-sectional area is specified in NFPA 79 using American Wire Gauge (AWG) (USA). See Annex G.

13.2.2: 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).

13.2.3: The colour identification WHITE or GREY is used for earthed neutral conductors instead of the colour identification BLUE (USA and Canada).

15.2.2: First paragraph: Maximum value between conductors 150 V (USA).

15.2.2: Second paragraph, 5th bullet: The full load current rating of lighting circuits does not exceed 15 A (USA).

16.4: Nameplate marking requirements (USA).

A.2.2.2: The permissible maximum value of R_A is regulated (e.g. when $U_o \geq 300$V, R_A shall be less than 10 Ω, when $U_o < 300$ V, R_A shall be less than 100 Ω, U_o is the nominal AC line to earth voltage in volts (V) (Japan).

A.2.2.2: The maximum permissible value of R_A is 83 Ω (Netherlands).

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 document using a colour printer.

INTRODUCTION

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

– safety of persons and property;

– consistency of control response;

– ease of operation and maintenance.

More guidance on the use of this part of IEC 60204 is given in Annex F.

Figure 1 has been provided as an aid to the understanding of the inter-relationship of the various elements of a machine and its associated equipment. Figure 1 is a block diagram of a typical machine and associated equipment showing the various elements of the electrical equipment addressed in this part of IEC 60204. Numbers in parentheses ( ) refer to Clauses and Subclauses in this part of IEC 60204. It is understood in Figure 1 that all of the elements taken together including the safeguards, tooling/fixturing, software, and the documentation, constitute the machine, and that one or more machines working together with usually at least one level of supervisory control constitute a manufacturing cell or system.

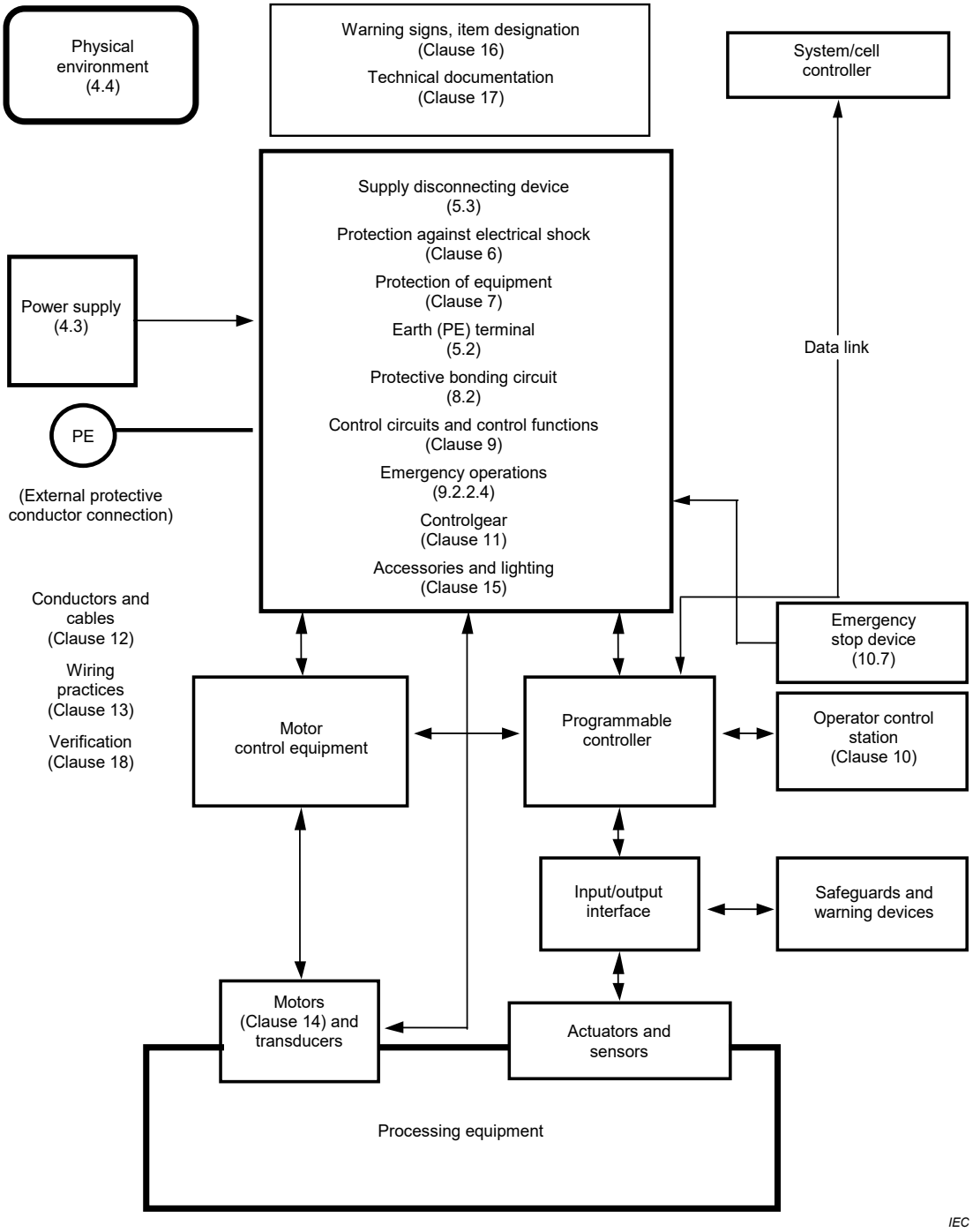

Figure 1 – Block diagram of a typical machine

SAFETY OF MACHINERY – ELECTRICAL EQUIPMENT OF MACHINES –

Part 1: General requirements

1 Scope

This part of IEC 60204 applies to electrical, electronic and programmable electronic equipment and systems to machines not portable by hand while working, including a group of machines working together in a co-ordinated manner.

NOTE 1 This part of IEC 60204 is an application standard and is not intended to limit or inhibit technological advancement.

NOTE 2 In this part of IEC 60204, the term “electrical” includes electrical, electronic and programmable electronic matters (i.e. “electrical equipment” means electrical, electronic and programmable electronic equipment).

NOTE 3 In the context of this part of IEC 60204, 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 machine in question.

The equipment covered by this part of IEC 60204 commences at the point of connection of the supply to the electrical equipment of the machine (see 5.1).

NOTE 4 The requirements for the electrical supply installation are given in the IEC 60364 series.

This part of IEC 60204 is applicable to the electrical equipment or parts of the electrical equipment that operate with nominal supply voltages not exceeding 1 000 V for alternating current (AC) and not exceeding 1 500 V for direct current (DC), and with nominal supply frequencies not exceeding 200 Hz.

NOTE 5 Information on electrical equipment or parts of the electrical equipment that operate with higher nominal supply voltages can be found in IEC 60204-11.

This part of IEC 60204 does not cover all the requirements (for example guarding, interlocking, or control) that are needed or required by other standards or regulations in order to protect persons from hazards other than electrical hazards. Each type of machine has unique requirements to be accommodated to provide adequate safety.

This part of IEC 60204 specifically includes, but is not limited to, the electrical equipment of machines as defined in 3.1.40.

NOTE 6 Annex C lists examples of machines whose electrical equipment can be covered by this part of IEC 60204.

This part of IEC 60204 does not specify additional and special requirements that can apply to the electrical equipment of machines that, for example:

– are intended for use in open air (i.e. outside buildings or other protective structures);
– use, process, or produce potentially explosive material (for example paint or sawdust);
– are intended for use in potentially explosive and/or flammable atmospheres;
– have special risks when producing or using certain materials;
– are intended for use in mines;
– are sewing machines, units, and systems (which are covered by IEC 60204-31);
– are hoisting machines (which are covered by IEC 60204-32);
– are semiconductor fabrication equipment (which are covered by IEC 60204-33).