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)

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AS/NZS 4024.1204:2019

This Joint Australian/New Zealand Standard™ was prepared by Joint Technical Committee SF-041, Safety of Machinery. It was approved on behalf of the Council of Standards Australia on 11 June 2019 and by the New Zealand Standards Approval Board on 3 July 2019.

This Standard was published on 31 July 2019.

The following are represented on Committee SF-041:

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This Standard was issued in draft form for comment as DR AS 4024.1204:2019.

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ISBN 978 1 76072 538 9

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.

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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.

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

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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.

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NOTES

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CONTENTS

FOREWORD....10
INTRODUCTION....13
1 Scope....15
2 Normative references....16
3 Terms,definitions and abbreviated terms....17
3.1 Terms and definitions....17
3.2 Abbreviated terms....26
4 General requirements....26
4.1 General....26
4.2 Selection of equipment....27
4.2.1 General....27
4.2.2 Switchgear....27
4.3 Electrical supply....28
4.3.1 General....28
4.3.2 AC supplies....28
4.3.3 DC supplies....28
4.3.4 Special supply systems....28
4.4 Physical environment and operating conditions....28
4.4.1 General....28
4.4.2 Electromagnetic compatibility (EMC)....29
4.4.3 Ambient air temperature....29
4.4.4 Humidity....29
4.4.5 Altitude....29
4.4.6 Contaminants....29
4.4.7 Ionizing and non-ionizing radiation....30
4.4.8 Vibration, shock, and bump....30
4.5 Transportation and storage....30
4.6 Provisions for handling....30
5 Incoming supply conductor terminations and devices for disconnecting and switching off....30
5.1 Incoming supply conductor terminations....30
5.2 Terminal for connection of the external protective conductor....31
5.3 Supply disconnecting (isolating) device....31
5.3.1 General....31
5.3.2 Type....31
5.3.3 Requirements....32
5.3.4 Operating means of the supply disconnecting device....32
5.3.5 Excepted circuits....33
5.4 Devices for removal of power for prevention of unexpected start-up....34
5.5 Devices for isolating electrical equipment....34
5.6 Protection against unauthorized, inadvertent and/or mistaken connection....35
6 Protection against electric shock....35
6.1 General....35
6.2 Basic protection....35
6.2.1 General....35
6.2.2 Protection by enclosures....36

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6.2.3 Protection by insulation of live parts 37
6.2.4 Protection against residual voltages 37
6.2.5 Protection by barriers 37
6.2.6 Protection by placing out of reach or protection by obstacles 37
6.3 Fault protection 37
6.3.1 General 37
6.3.2 Prevention of the occurrence of a touch voltage 38
6.3.3 Protection by automatic disconnection of supply 38
6.4 Protection by the use of PELV 39
6.4.1 General requirements 39
6.4.2 Sources for PELV 40
7 Protection of equipment 40
7.1 General 40
7.2 Overcurrent protection 40
7.2.1 General 40
7.2.2 Supply conductors 40
7.2.3 Power circuits 41
7.2.4 Control circuits 41
7.2.5 Socket outlets and their associated conductors 41
7.2.6 Lighting circuits 41
7.2.7 Transformers 42
7.2.8 Location of overcurrent protective devices 42
7.2.9 Overcurrent protective devices 42
7.2.10 Rating and setting of overcurrent protective devices 42
7.3 Protection of motors against overheating 42
7.3.1 General 42
7.3.2 Overload protection 43
7.3.3 Over-temperature protection 43
7.4 Protection against abnormal temperature 43
7.5 Protection against the effects of supply interruption or voltage reduction and subsequent restoration 44
7.6 Motor overspeed protection 44
7.7 Additional earth fault/residual current protection 44
7.8 Phase sequence protection 44
7.9 Protection against overvoltages due to lightning and to switching surges 44
7.10 Short-circuit current rating 45
8 Equipotential bonding 45
8.1 General 45
8.2 Protective bonding circuit 47
8.2.1 General 47
8.2.2 Protective conductors 47
8.2.3 Continuity of the protective bonding circuit 48
8.2.4 Protective conductor connecting points 49
8.2.5 Mobile machines 49
8.2.6 Additional requirements for electrical equipment having earth leakage currents higher than 10 mA 49
8.3 Measures to restrict the effects of high leakage current 50
8.4 Functional bonding 50
9 Control circuits and control functions 50

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9.1 Control circuits 50
9.1.1 Control circuit supply 50
9.1.2 Control circuit voltages 51
9.1.3 Protection 51
9.2 Control functions 51
9.2.1 General 51
9.2.2 Categories of stop functions 51
9.2.3 Operation 51
9.2.4 Cableless control system (CCS) 55
9.3 Protective interlocks 57
9.3.1 Reclosing or resetting of an interlocking safeguard 57
9.3.2 Exceeding operating limits 57
9.3.3 Operation of auxiliary functions 57
9.3.4 Interlocks between different operations and for contrary motions 57
9.3.5 Reverse current braking 57
9.3.6 Suspension of safety functions and/or protective measures 58
9.4 Control functions in the event of failure 58
9.4.1 General requirements 58
9.4.2 Measures to minimize risk in the event of failure 59
9.4.3 Protection against malfunction of control circuits 60
10 Operator interface and machine-mounted control devices 66
10.1 General 66
10.1.1 General requirements 66
10.1.2 Location and mounting 66
10.1.3 Protection 66
10.1.4 Position sensors 66
10.1.5 Portable and pendant control stations 67
10.2 Actuators 67
10.2.1 Colours 67
10.2.2 Markings 67
10.3 Indicator lights and displays 68
10.3.1 General 68
10.3.2 Colours 68
10.3.3 Flashing lights and displays 69
10.4 Illuminated push-buttons 69
10.5 Rotary control devices 69
10.6 Start devices 69
10.7 Emergency stop devices 70
10.7.1 Location of emergency stop devices 70
10.7.2 Types of emergency stop device 70
10.7.3 Operation of the supply disconnecting device to effect emergency stop 70
10.8 Emergency switching off devices 70
10.8.1 Location of emergency switching off devices 70
10.8.2 Types of emergency switching off device 70
10.8.3 Local operation of the supply disconnecting device to effect emergency switching off 71
10.9 Enabling control device 71
11 Controlgear: location, mounting, and enclosures 71
11.1 General requirements 71

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11.2 Location and mounting 71
11.2.1 Accessibility and maintenance 71
11.2.2 Physical separation or grouping 72
11.2.3 Heating effects 72
11.3 Degrees of protection 73
11.4 Enclosures, doors and openings 73
11.5 Access to electrical equipment 74
12 Conductors and cables 74
12.1 General requirements 74
12.2 Conductors 74
12.3 Insulation 75
12.4 Current-carrying capacity in normal service 75
12.5 Conductor and cable voltage drop 76
12.6 Flexible cables 77
12.6.1 General 77
12.6.2 Mechanical rating 77
12.6.3 Current-carrying capacity of cables wound on drums 77
12.7 Conductor wires, conductor bars and slip-ring assemblies 78
12.7.1 Basic protection 78
12.7.2 Protective conductors 78
12.7.3 Protective conductor current collectors 78
12.7.4 Removable current collectors with a disconnector function 79
12.7.5 Clearances in air 79
12.7.6 Creepage distances 79
12.7.7 Conductor system sectioning 79
12.7.8 Construction and installation of conductor wire, conductor bar systems and slip-ring assemblies 79
13 Wiring practices 80
13.1 Connections and routing 80
13.1.1 General requirements 80
13.1.2 Conductor and cable runs 80
13.1.3 Conductors of different circuits 81
13.1.4 AC circuits – Electromagnetic effects (prevention of eddy currents) 81
13.1.5 Connection between pick-up and pick-up converter of an inductive power supply system 81
13.2 Identification of conductors 81
13.2.1 General requirements 81
13.2.2 Identification of the protective conductor / protective bonding conductor 82
13.2.3 Identification of the neutral conductor 82
13.2.4 Identification by colour 83
13.3 Wiring inside enclosures 83
13.4 Wiring outside enclosures 84
13.4.1 General requirements 84
13.4.2 External ducts 84
13.4.3 Connection to moving elements of the machine 84
13.4.4 Interconnection of devices on the machine 85
13.4.5 Plug/socket combinations 85
13.4.6 Dismantling for shipment 86
13.4.7 Additional conductors 86

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13.5 Ducts, connection boxes and other boxes 86
13.5.1 General requirements 86
13.5.2 Rigid metal conduit and fittings 87
13.5.3 Flexible metal conduit and fittings 87
13.5.4 Flexible non-metallic conduit and fittings 87
13.5.5 Cable trunking systems 87
13.5.6 Machine compartments and cable trunking systems 88
13.5.7 Connection boxes and other boxes 88
13.5.8 Motor connection boxes 88
14 Electric motors and associated equipment 88
14.1 General requirements 88
14.2 Motor enclosures 88
14.3 Motor dimensions 89
14.4 Motor mounting and compartments 89
14.5 Criteria for motor selection 89
14.6 Protective devices for mechanical brakes 89
15 Socket-outlets and lighting 90
15.1 Socket-outlets for accessories 90
15.2 Local lighting of the machine and of the equipment 90
15.2.1 General 90
15.2.2 Supply 90
15.2.3 Protection 91
15.2.4 Fittings 91
16 Marking, warning signs and reference designations 91
16.1 General 91
16.2 Warning signs 91
16.2.1 Electric shock hazard 91
16.2.2 Hot surfaces hazard 92
16.3 Functional identification 92
16.4 Marking of enclosures of electrical equipment 92
16.5 Reference designations 92
17 Technical documentation 92
17.1 General 92
17.2 Information related to the electrical equipment 93
18 Verification 94
18.1 General 94
18.2 Verification of conditions for protection by automatic disconnection of supply 94
18.2.1 General 94
18.2.2 Test 1 – Verification of the continuity of the protective bonding circuit 95
18.2.3 Test 2 – Fault loop impedance verification and suitability of the associated overcurrent protective device 95
18.2.4 Application of the test methods for TN-systems 95
18.3 Insulation resistance tests 97
18.4 Voltage tests 98
18.5 Protection against residual voltages 98
18.6 Functional tests 98
18.7 Retesting 98
Annex A (normative) Fault protection by automatic disconnection of supply 99

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A.1 Fault protection for machines supplied from TN-systems 99
A.1.1 General 99
A.1.2 Conditions for protection by automatic disconnection of the supply by overcurrent protective devices 99
A.1.3 Condition for protection by reducing the touch voltage below 50 V 100
A.1.4 Verification of conditions for protection by automatic disconnection of the supply 101
A.2 Fault protection for machines supplied from TT-systems 103
A.2.1 Connection to earth 103
A.2.2 Fault protection for TT systems 103
A.2.3 Verification of protection by automatic disconnection of supply using a residual current protective device 104
A.2.4 Measurement of the fault loop impedance (Z_S) 105
Annex B (informative) Enquiry form for the electrical equipment of machines 107
Annex C (informative) Examples of machines covered by this part of IEC 60204 111
Annex D (informative) Current-carrying capacity and overcurrent protection of conductors and cables in the electrical equipment of machines 113
D.1 General 113
D.2 General operating conditions 113
D.2.1 Ambient air temperature 113
D.2.2 Methods of installation 113
D.2.3 Grouping 115
D.2.4 Classification of conductors 116
D.3 Co-ordination between conductors and protective devices providing overload protection 116
D.4 Overcurrent protection of conductors 117
D.5 Effect of harmonic currents on balanced three-phase systems 118
Annex E (informative) Explanation of emergency operation functions 119
Annex F (informative) Guide for the use of this part of IEC 60204 120
Annex G (informative) Comparison of typical conductor cross-sectional areas 122
Annex H (informative) Measures to reduce the effects of electromagnetic influences 124
H.1 Definitions 124
H.1.1 apparatus 124
H.1.2 fixed installation 124
H.2 General 124
H.3 Mitigation of electromagnetic interference (EMI) 124
H.3.1 General 124
H.3.2 Measures to reduce EMI 125
H.4 Separation and segregation of cables 125
H.5 Power supply of a machine by parallel sources 129
H.6 Supply impedance where a Power Drive System (PDS) is used 129
Annex I (informative) Documentation / Information 130
Bibliography 132

Figure 1 – Block diagram of a typical machine 14
Figure 2 – Disconnector isolator 33
Figure 3 – Disconnecting circuit breaker 33
Figure 4 – Example of equipotential bonding for electrical equipment of a machine 46

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Figure 5 – Symbol IEC 60417-5019: Protective earth 49
Figure 6 – Symbol IEC 60417-5020: Frame or chassis 50
Figure 7 – Method a) Earthed control circuit fed by a transformer 60
Figure 8 – Method b1) Non-earthed control circuit fed by transformer 61
Figure 9 – Method b2) Non-earthed control circuit fed by transformer 62
Figure 10 – Method b3) Non-earthed control circuit fed by transformer 62
Figure 11 – Method c) Control circuits fed by transformer with an earthed centre-tap winding 63
Figure 12 – Method d1a) Control circuit without transformer connected between a phase and the neutral of an earthed supply system 64
Figure 13 – Method d1b) Control circuit without transformer connected between two phases of an earthed supply system 64
Figure 14 – Method d2a) Control circuit without transformer connected between phase and neutral of a non-earthed supply system 65
Figure 15 – Method d2b) control circuit without transformer connected between two phases of a non-earthed supply system 65
Figure 16 – Symbol IEC 60417-5019 82
Figure 17 – Symbol IEC 60417-5021 82
Figure 18 – Symbol ISO 7010-W012 91
Figure 19 – Symbol ISO 7010-W017 92
Figure A.1 – Typical arrangement for fault loop impedance (Z_S) measurement in TN systems 102
Figure A.2 – Typical arrangement for fault loop impedance (Z_S) measurement for power drive system circuits in TN systems 102
Figure A.3 – Typical arrangement for fault loop impedance (Z_S) measurement in TT systems 105
Figure A.4 – Typical arrangement for fault loop impedance (Z_S) measurement for power drive system circuits in TT systems 106
Figure D.1 – Methods of conductor and cable installation independent of number of conductors/cables 114
Figure D.2 – Parameters of conductors and protective devices 116
Figure H.1 – By-pass conductor for screen reinforcement 125
Figure H.2 – Examples of vertical separation and segregation 127
Figure H.3 – Examples of horizontal separation and segregation 127
Figure H.4 – Cable arrangements in metal cable trays 128
Figure H.5 – Connections between metal cable trays or cable trunking systems 128
Figure H.6 – Interruption of metal cable trays at fire barriers 129

Table 1 – Minimum cross-sectional area of copper protective conductors 31
Table 2 – Symbols for actuators (Power) 68
Table 3 – Symbols for actuators (Machine operation) 68
Table 4 – Colours for indicator lights and their meanings with respect to the condition of the machine 69
Table 5 – Minimum cross-sectional areas of copper conductors 75

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Table 6 – Examples of current-carrying capacity (I_Z) of PVC insulated copper conductors or cables under steady-state conditions in an ambient air temperature of +40 °C for different methods of installation 76
Table 7 – Derating factors for cables wound on drums 78
Table 8 – Minimum permitted bending radii for the forced guiding of flexible cables 85
Table 9 – Application of the test methods for TN-systems 96
Table 10 – Examples of maximum cable lengths from protective devices to their loads for TN-systems 97
Table A.1 – Maximum disconnecting times for TN systems 99
Table A.2 – Maximum disconnecting time for TT-systems 104
Table D.1 – Correction factors 113
Table D.2 – Derating factors for I_Z for grouping 115
Table D.3 – Derating factors for I_Z for multicore cables up to 10 mm^2 115
Table D.4 – Classification of conductors 116
Table D.5 – Maximum allowable conductor temperatures under normal and short-circuit conditions 117
Table F.1 – Application options 121
Table G.1 – Comparison of conductor sizes 122
Table H.1 – Minimum separation distances using metallic containment as illustrated in Figure H.2 126
Table I.1 – Documentation / Information that can be applicable 130

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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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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;

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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.

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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.

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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.

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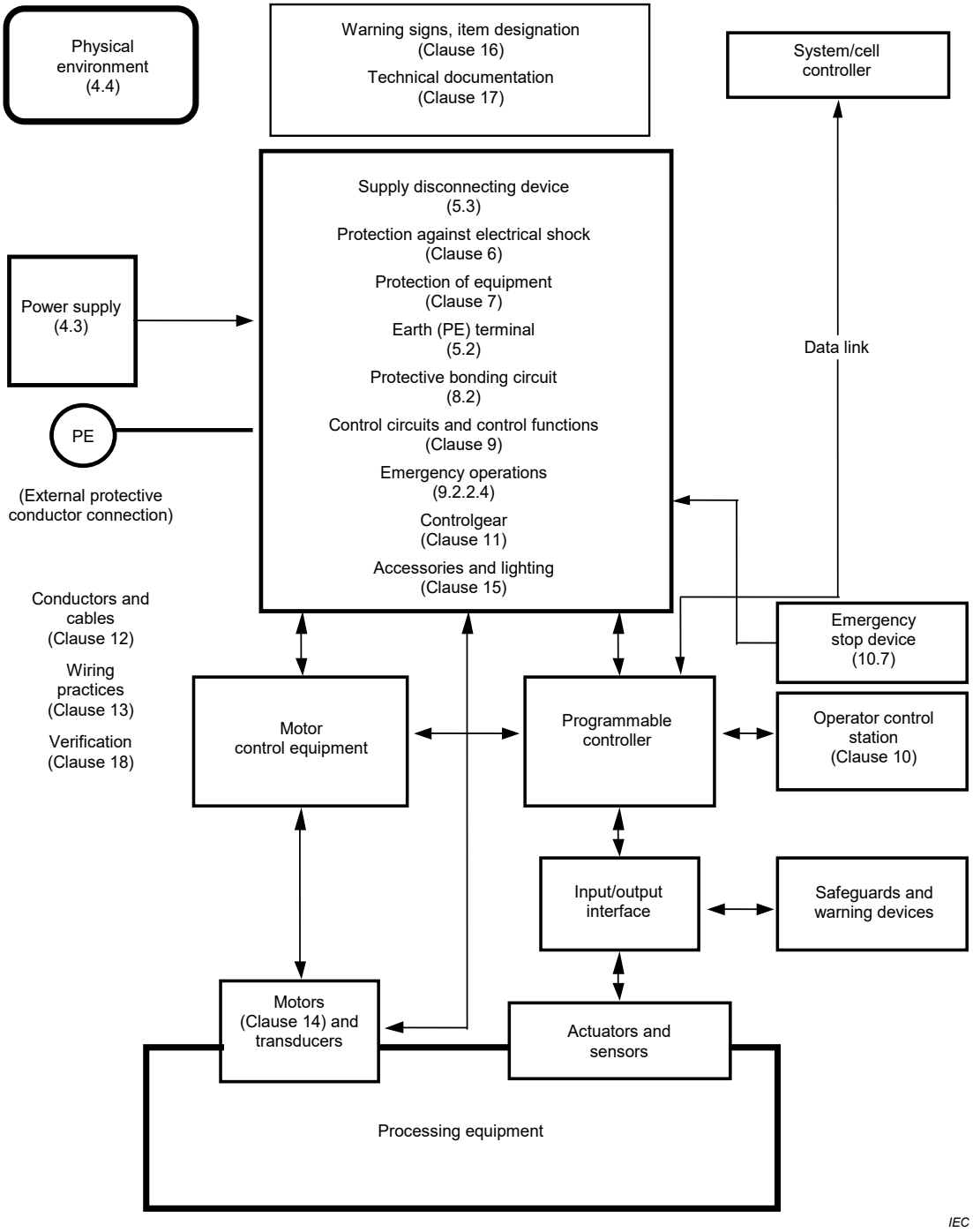

Figure 1 – Block diagram of a typical machine

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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).

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