IEC 60204-1

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INTERNATIONAL STANDARD

NORME INTERNATIONALE

AMENDMENT 1
AMENDEMENT 1

Safety of machinery – Part 1: General requirements

Sécurité des machines – Partie 1: Exigences générales

IEC 60204-1:2016-10/AMD1:2021-09(en-fr)

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SAFETY OF MACHINERY –

Part 1: General requirements

AMENDMENT 1

FOREWORD

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Amendment 1 to IEC 60204-1:2016 has been prepared by IEC technical committee 44: Safety of machinery – Electrotechnical aspects.

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

Draft	Report on voting
44/884/CDV	44/913/RVC

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

The language used for the development of this Amendment is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/standardsdev/publications/.

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- withdrawn,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

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FOREWORD

Replace the 7th item under the 8th paragraph with:

6.3.3 b): The use of residual current protective devices with a rated residual operating current which is coordinated with the earth electrode resistance is mandatory in TT systems as a means for fault protection by automatic disconnection of supply (Italy).

Replace the 8th item under the 8th paragraph with:

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

Add the following new item after the 8th item under the 8th paragraph with:

7.2.3: Disconnection of the neutral conductor is mandatory in TN-systems (Norway).

2 Normative References

Delete the existing reference to IEC 60034-1.

Replace the existing reference to IEC 60364-4-41 with the following new reference:

IEC 60364-4-41:2005, *Low-voltage electrical installations – Part 4-41: Protection for safety – Protection against electric shock*
IEC 60364-4-41:2005/AMD1:2017

Replace the existing reference to IEC 60364-5-53 with the following new reference:

IEC 60364-5-53:2019, *Low-voltage electrical installations – Part 5-53: Selection and erection of electrical equipment – Devices for protection for safety, isolation, switching, control and monitoring*

Add the following new reference:

IEC 60364-6:2016, *Low-voltage electrical installations – Part 6: Verification*

Replace the existing reference to IEC 60445 with the following new reference:

IEC 60445:2017, *Basic and safety principles for man-machine interface, marking and identification – Identification of equipment terminals, conductor terminations and conductors*

Replace the existing reference to IEC 60947-5-1 with the following new reference:

IEC 60947-5-1:2016, *Low-voltage switchgear and controlgear – Part 5-1: Control circuit devices and switching elements – Electromechanical control circuit devices*

Replace the existing reference to IEC 61558-1 with the following new reference:

IEC 61558-1:2017, *Safety of transformers, reactors, power supply units and combinations thereof – Part 1: General requirements and tests*

Replace the existing reference to ISO 7010 with the following new reference:

ISO 7010:2019, *Graphical symbols – Safety colours and safety signs – Registered safety signs*
ISO 7010:2019/AMD1:2020

Replace the existing reference to ISO 13850 with the following new reference:

ISO 13850:2015, *Safety of machinery – Emergency stop function – Principles for design*

3.1 Terms and definitions

Replace existing source reference for term 3.1.16 "direct opening action" with the following new text:

[SOURCE: IEC 60947-5-1:2016, K.2.2]

Replace the existing source reference for term 3.1.21 "emergency stop device" with the following new text:

[SOURCE: ISO 13850:2015, 3.3, modified – Note has been added]

4.4.2 Electromagnetic Compatibility

Delete the existing second paragraph of Subclause 4.4.2.

Rename existing NOTE to NOTE 1 and add, after NOTE 1, the following new NOTE 2:

NOTE 2 Annex H provides examples of measures to reduce the effects of electromagnetic influences.

4.4.5 Altitude

Replace the existing text of the second paragraph of Subclause 4.4.5 before the hyphenated list with the following new text:

For equipment to be used at higher altitudes, it is necessary to take into account changes in parameters for example, the reduction of:

Add, at the beginning of the third paragraph of Subclause 4.4.5, the following new text:

Other parameters of different components can also alter with altitude.

6.3.1 General

Replace the text of NOTE 1 with the following new text:

The risk of harmful physiological effects from touch voltages depends upon a number of factors. These include but are not limited to; value of touch voltage, duration of possible exposure, environmental factors, skin condition.

8.2.1 General

Replace the fourth bulleted item of Subclause 8.2.1 with the following new text:

- those conductive structural parts of the machine used for protective bonding.

8.2.2 Protective Conductors

Replace the existing text of the fifth paragraph of Subclause 8.2.2 with the following new text:

Each protective conductor shall:

- be part of a multicore cable, or;
- be in a common enclosure with the line conductor, or;
- have a cross-sectional area of at least:
  - 2,5 mm^2 Cu or 16 mm^2 Al if protection against mechanical damage is provided;
  - 4 mm^2 Cu or 16 mm^2 Al if protection against mechanical damage is not provided.

NOTE 1 The use of steel for a protective conductor is not excluded.

Delete the first bulleted list item of the seventh paragraph of Subclause 8.2.2 ("conductive structural parts of the machine").

9.2.3.2 Start

Replace the existing fourth paragraph of Subclause 9.2.3.2 with the following new text:

The provision of acoustic and/or visual warning signals before the starting of hazardous machine operation shall be considered during the risk assessment. Where the risk assessment determines that either or both are required the emission level of these warning signals shall be suitable for the intended environment.

9.2.3.4.3 Emergency Switching Off

Replace, in the first paragraph of Subclause 9.2.3.3.4, "IEC 60364-5-53:2001" *with* "IEC 60364-5-53:2019".

9.2.4.1 General requirements

Replace the existing second paragraph of Subclause 9.2.4.1 with the following new text:

Where a safety function of a CCS relies on data transmission the transmission reliability shall be considered.

Replace existing NOTE 3 with the following new text:

NOTE 3 IEC 62745 deals with cableless control systems for electrical equipment of machinery..

9.2.4.8 Emergency stop reset

Replace the existing third paragraph of Subclause 9.2.4.8 with the following new text:

Where the risk assessment shows that resetting of an emergency stop actuator on the portable cableless operator control station is not adequate then one or more supplementary fixed resets shall be provided.

10.8.2 Types of emergency switching off device

Replace the existing second paragraph of Subclause 10.8.2 with the following new text:

The devices shall have direct opening action (see Annex K of IEC 60947-5-1:2016).

11.4 Enclosures, doors and openings

In the ninth paragraph of Subclause 11.4, replace the first occurrence of "harmful" *with* "detrimental".

12.3 Insulation

Replace, in the first paragraph of Subclause 12.3, "should be sought" *with* "shall be considered".

13.2.3 Identification of the neutral conductor

Replace, in the first paragraph of Subclause 13.2.3, "IEC 60445:2010" *with IEC 60445:2017.*

13.5.2 Rigid metal conduit and fittings

Replace the existing second sentence of the first paragraph of Subclause 13.5.2 with the following new text:

Where galvanic action is possible between dissimilar metals these metal combinations shall not be used.

16.4 Marking of enclosures of electrical equipment

Delete the existing second bullet point of Subclause 16.4.

18.1 General

Add, at the end of the second paragraph of Subclause 18.1, the following new text:

Where the sequence cannot be followed verification a) and b) shall be conducted first.

18.2.2 Test 1 – Verification of the continuity of the protective bonding circuit

Replace, in the first paragraph of Subclause 18.2.2, "IEC 60364-4-41:2005" with "IEC 60364-4-41:2005+AMD1:2017"

18.2.3 Test 2 – Fault loop impedance verification and suitability of the associated overcurrent protective device

Replace the existing second dashed list item under item a) of the second paragraph of Subclause 18.2.3 with the following new text:

– measurement in accordance with A.1.4 for TN-systems or A.2.4 for TT-systems, and

18.4 Voltage tests

Delete the existing first paragraph of Subclause 18.4 and add the following new Note after the new first paragraph (previously second paragraph):

NOTE Test equipment in accordance with IEC 61180 or IEC 61557-14 can be used to perform voltage testing.

A.1.1 General

Replace the existing first paragraph of Subclause A.1.1 with the following new text:

The provisions in Annex A are derived from IEC 60364-4-41:2005+AMD1:2017, and IEC 60364-6:2016.

A.1.2 Conditions for protection by automatic disconnection of the supply by overcurrent protective devices

Replace the existing text of the third paragraph of Subclause A.1.2 with the following new text:

Where the value of the fault loop impedance exceeds $2U_0/3I_a$, a more precise assessment can be made in accordance with the procedure described in D.6.4.3.7.3 of IEC 60364-6:2016.

A.2.1 Connection to earth

In the NOTE replace the reference "IEC 60364-4-41:2005" *with* "IEC 60364-4-41:2005+AMD1:2017".

A.2.2 Protection by residual current protective device (RCD)

Replace, in NOTE 2, the reference "IEC 60364-5-53:2001" *with* "IEC 60364-5-53:2019".

H.2 General

Add, at the end of Clause H.2, the following new text:

In some applications, immunity and/or emission requirements of the electrical equipment can be met when the following conditions are fulfilled:

- the incorporated devices and components comply with the EMC requirements for the intended EMC environment specified in the relevant product standard (or generic standard where no product standard exists), and;
- the electrical installation and wiring are consistent with the instructions provided by the supplier of the devices and components with regard to mutual influences, (cabling, screening, earthing etc.) or with this informative Annex H if such instructions are not available from the supplier.

Bibliography

Add the following new reference:

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

Replace the existing reference to IEC 60204-11 with the following new reference:

IEC 60204-11:2018, *Safety of machinery – Electrical equipment of machines – Part 11: Requirements for equipment for voltages above 1 000 V AC or 1 500 V DC and not exceeding 36 kV*

Replace the existing reference to IEC 60909-0 with the following new reference:

IEC 60909-0:2016, *Short-circuit currents in three-phase a.c. systems – Part 0: Calculation of currents*

Replace the existing reference to IEC 60947-5-2 with the following new reference:

IEC 60947-5-2:2019, *Low-voltage switchgear and controlgear – Part 5-2: Control circuit devices and switching elements – Proximity switches*

Replace the existing reference to IEC 61000-6-1 with the following new reference:

IEC 61000-6-1:2016, *Electromagnetic compatibility (EMC) – Part 6-1: Generic standards – Immunity standard for residential, commercial and light-industrial environments*

Replace the existing reference to IEC 61000-6-2 with the following new reference:

IEC 61000-6-2:2016, *Electromagnetic compatibility (EMC) – Part 6-2: Generic standards – Immunity standard for industrial environments*

Replace the existing reference to IEC 61000-6-4 with the following new reference:

IEC 61000-6-4:2018, *Electromagnetic compatibility (EMC) – Part 6-4: Generic standards – Emission standard for industrial environments*

Replace the existing reference to IEC 61180 with the following new reference:

IEC 61180, *High-voltage test techniques for low-voltage equipment – Definitions, test and procedure requirements, test equipment*

Replace the existing reference to IEC 61496-1 with the following new reference:

IEC 61496-1:2020, *Safety of machinery – Electro-sensitive protective equipment – Part 1: General requirements and tests*

Replace the existing reference to IEC 62745 with the following new reference:

IEC 62745, *Safety of machinery – Requirements for cableless control systems of machinery*