

# NEK EN 60204-1:2018

## Safety of machinery

*Electrical equipment of machines*

*Part 1: General requirements*

Norwegian electrotechnical standard

## Maskinsikkerhet

*Elektrisk utstyr i maskiner*

*Del 1: Generelle krav*



Engelsk versjon

EUROPEAN STANDARD

**EN 60204-1**

NORME EUROPÉENNE

EUROPÄISCHE NORM

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English Version

**Safety of machinery - Electrical equipment of machines -  
Part 1: General requirements  
(IEC 60204-1:2016 , modified)**

Sécurité des machines - Équipement électrique des  
machines - Partie 1: Exigences générales  
(IEC 60204-1:2016 , modifiée)

Sicherheit von Maschinen - Elektrische Ausrüstung von  
Maschinen - Teil 1: Allgemeine Anforderungen  
(IEC 60204-1:2016 , modifiziert)

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Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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

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## European foreword

This document (EN 60204-1:2018) consists of the text of IEC 60204-1:2016, prepared by IEC/TC 44 "Safety of machinery - Electrotechnical aspects", together with the common modifications prepared by CLC/TC 44X "Safety of machinery: electrotechnical aspects".

The following dates are fixed:

- latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2019-03-14
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) 2021-09-14

This document supersedes EN 60204-1:2006.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC shall not be held responsible for identifying any or all such patent rights.

Clauses, subclauses, notes, tables, figures and annexes which are additional to those in IEC 60204-1:2016 are prefixed "Z".

This document has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For the relationship with EU Directives, see informative Annexes ZZA and ZZB, which are integral parts of this document.

## Endorsement notice

The text of the International Standard IEC 60204-1:2016 was approved by CENELEC as a European Standard with agreed common modifications.

## COMMON MODIFICATIONS

### 1 Modification to Clause 2, Normative references

Add the following note after the first paragraph:

NOTE In CENELEC, Annex ZA applies instead of Clause 2.

### 2 Modifications to Clause 4

#### 4.4.2 Electromagnetic Compatibility

Delete the 2<sup>nd</sup> paragraph and related bulleted list.

#### 4.4.5 Altitude

Replace the text of the 2<sup>nd</sup> paragraph before the hyphenated list with:

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

Add the start of the 3<sup>rd</sup> paragraph:

“Other parameters of different components can also alter with altitude.”.

### 3 Modifications to Clause 6

#### 6.3.1 General

Replace the text of Note 1 with:

“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”.

### 4 Modifications to Clause 9

#### 9.2.3.2 Start

Replace the 4<sup>th</sup> paragraph with:

“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 noise/light shall be suitable for the intended environment.”.

#### 9.2.4.1 General requirements

Replace the 2<sup>nd</sup> paragraph with:

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

#### **9.2.4.8 Emergency stop reset**

Replace the last paragraph with:

“Where the risk assessment show 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.”.

### **5 Modifications to Clause 11**

#### **11.4 Enclosures, doors and openings**

In the 8<sup>th</sup> paragraph, replace “harmful” with “detrimental”.

### **6 Modifications to Clause 12**

#### **12.3 Insulation**

In the 1<sup>st</sup> paragraph, replace “should” with “shall”.

### **7 Modifications to Clause 13**

#### **13.5.2 Rigid metal conduit fittings**

First paragraph, 2<sup>nd</sup> sentence, replace with “Where galvanic action is possible between dissimilar metals these metal combinations shall not be used”.

### **8 Modifications to Clause 16**

#### **16.1 General**

Add to the first paragraph: “The markings shall be sufficiently durable to remain legible for the foreseen lifetime of the machine.”.

#### **16.4 Marking of enclosures of electrical equipment**

Delete the 2<sup>nd</sup> bullet.

## 9 Modifications to Clause 18

### 18.1 General

Add to paragraph 2: “Where the sequence cannot be followed verification a) and b) shall be conducted first.”.

### 18.4 Voltage tests

Replace the first paragraph with “When voltage tests are performed, tests and test equipment shall be in accordance with EN 61180.”.

## 10 Modification to annexes

Add the following annexes.

## Annex ZA (normative)

### Normative references to international publications with their corresponding European publications

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

NOTE 1 Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: [www.cenelec.eu](http://www.cenelec.eu).

<b>Publication</b>	<b>Year</b>	<b>Title</b>	<b>EN/HD</b>	<b>Year</b>
IEC 60034-1 (mod)	2010	Rotating electrical machines - Part 1: Rating and performance	EN 60034-1	2010
-	-		+ corr. October	2010
IEC 60072	series	Dimensions and output series for rotating electrical machines	-	-
IEC 60309-1	1999	Plugs, socket-outlets and couplers for industrial purposes -	EN 60309-1	1999
+ A1 (mod)	2005	Part 1: General requirements	+ A1	2007
+ A2	2012		+ A2	2012
IEC 60364-1 (mod)	2005	Low-voltage electrical installations - Part 1: Fundamental principles, assessment of general characteristics, definitions	HD 60364-1	2008
IEC 60364-4-41 (mod)	2005	Low-voltage electrical installations - Part 4-41: Protection for safety - Protection against electric shock	HD 60364-4-41	2007
-	-		+ corr. July	2007
IEC 60364-4-43 (mod)	2008	Low voltage electrical installations - Part 4-43: Protection for safety - Protection against overcurrent	HD 60364-4-43	2010
IEC 60364-5-52 (mod)	2009	Low-voltage electrical installations - Part 5-52: Selection and erection of electrical equipment - Wiring systems	HD 60364-5-52	2011
IEC 60364-5-53	2001	Electrical installations of buildings - Part 5-53: Selection and erection of electrical equipment - Isolation, switching and control	-	-
+ A1 (mod)	2002		HD 60364-5-534	2008 <sup>1)</sup>
+ A2 (mod)	2015		HD 60364-5-534	2016 <sup>2)</sup>

1) IEC 60364-5-53:2001/A1:2002, Clause 534: "Devices for protection against overvoltages" is harmonized as HD 60364-5-534:2008. HD 60364-5-534:2008 will be superseded by HD 60364-5-534:2016 on 2018-12-14.

2) IEC 60364-5-53:2001/A2:2015, Clause 534: "Devices for protection against overvoltages" is harmonized as HD 60364-5-534:2016.



**EN 60204-1:2018 (E)**

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60364-5-54	2011	Low-voltage electrical installations - Part 5-54: Selection and erection of electrical equipment - Earthing arrangements and protective conductors	HD 60364-5-54	2011
IEC 60417-DB	2002	Graphical symbols for use on equipment	-	-
IEC 60445	2010	Basic and safety principles for man-machine interface, marking and identification - Identification of equipment terminals, conductor terminations and conductors	EN 60445	2010
IEC 60529	1989	Degrees of protection provided by enclosures (IP Code)	EN 60529	1991
-	-		+ corr. May	1993
+ A1	1999		+ A1	2000
+ A2	2013		+ A2	2013
IEC 60664-1	2007	Insulation coordination for equipment within low-voltage systems - Part 1: Principles, requirements and tests	EN 60664-1	2007
IEC 60947-2	2016	Low voltage switchgear and controlgear - Part 2: Circuit-breakers	EN 60947-2	2017
IEC 60947-3	2008	Low-voltage switchgear and controlgear -	EN 60947-3	2009
+ A1	2012	Part 3: Switches, disconnectors,	+ A1	2012
+ A2	2015	switch-disconnectors and fuse-combination units	+ A2	2015
IEC 60947-5-1	2003	Low-voltage switchgear and controlgear -	EN 60947-5-1	2004
-	-	Part 5-1: Control circuit devices and	+ corr. November	2004
-	-	switching elements - Electromechanical	+ corr. July	2005
+ A1	2009	control circuit devices	+ A1	2009
IEC 60947-5-5	1997	Low-voltage switchgear and controlgear -	EN 60947-5-5	1997
+ A1	2005	Part 5-5: Control circuit devices and	+ A1	2005
-	-	switching elements - Electrical	+ A11	2013
+ A2	2016	emergency stop device with mechanical latching function	+ A2	2017
IEC 60947-6-2	2002	Low-voltage switchgear and controlgear -	EN 60947-6-2	2003
+ A1	2007	Part 6-2: Multiple function equipment - Control and protective switching devices (or equipment) (CPS)	+ A1	2007
IEC 61140	2016	Protection against electric shock - Common aspects for installation and equipment	EN 61140	2016
IEC 61310	series	Safety of machinery - Indication, marking and actuation	EN 61310	series

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 61439-1	2011	Low-voltage switchgear and controlgear assemblies - Part 1: General rules	EN 61439-1	2011
IEC 61558-1	2005	Safety of power transformers, power supplies, reactors and similar products -	EN 61558-1	2005
-	-		+ corr. August	2006
+ A1	2009	Part 1: General requirements and tests	+ A1	2009
IEC 61558-2-6	2009	Safety of transformers, reactors, power supply units and similar products for supply voltages up to 1 100 V - Part 2-6: Particular requirements and tests for safety isolating transformers and power supply units incorporating safety isolating transformers	EN 61558-2-6	2009
IEC 61984	2008	Connectors - Safety requirements and tests	EN 61984	2009
IEC 62023	2011	Structuring of technical information and documentation	EN 62023	2012
IEC 62061	2005	Safety of machinery - Functional safety of safety-related electrical, electronic and programmable electronic control systems	EN 62061	2005
-	-		+ corr. February	2010
+ A1	2012		+ A1	2013
+ A2	2015		+ A2	2015
ISO 7010	2011	Graphical symbols - Safety colours and safety signs - Registered safety signs	EN ISO 7010	2012
+ A1	2012		+ A1	2014
+ A2	2012		+ A2	2014
+ A3	2012		+ A3	2014
+ A4	2013		+ A4	2014
+ A5	2014		+ A5	2015
+ A6	2014		+ A6	2016
+ A7	2016		+ A7	2017
ISO 13849-1	2015	Safety of machinery - Safety-related Parts of control systems - Part 1: General principles for design	EN ISO 13849-1	2015
ISO 13849-2	2012	Safety of machinery - Safety-related Parts of control systems - Part 2: Validation	EN ISO 13849-2	2012
ISO 13850	2006 <sup>3)</sup>	Safety of machinery - Emergency stop - Principles for design	EN ISO 13850	2006 <sup>4)</sup>

<sup>3)</sup> Superseded by ISO 13850:2015, *Safety of machinery - Emergency stop function - Principles for design*.

<sup>4)</sup> EN ISO 13850:2006 is superseded by EN ISO 13850:2015, which is based on ISO 13850:2015.

## Annex ZZA (informative)

### Relationship between this European Standard and the essential requirements of Directive 2006/42/EC [2006 OJ L 157] aimed to be covered

This European Standard has been prepared under a Commission's standardization request M/396 EN to provide one voluntary means of conforming to essential requirements of Directive 2006/42/EC of the European Parliament and of the Council of 17 May 2006 on machinery, and amending Directive 95/16/EC (recast) [2006 OJ L 157].

Once this standard is cited in the Official Journal of the European Union under that Directive, compliance with the normative clauses of this standard given in Table ZZA.1 confers, within the limits of the scope of this standard, a presumption of conformity with the corresponding requirements of that Directive, and associated EFTA regulations.

**Table ZZA.1 – Correspondence between this European Standard and Annex 1 of Directive 2006/42/EC [2006 OJ L 157]**

Essential Requirements of Directive 2006/42/EC	Clause(s) / sub-clause(s) of this EN	Remarks / Notes
1.2.1	Clause 4, 5.4, 7.4, 7.5, 7.6, 7.8, 7.10, 8.4, Clause 9, 10.6, 10.9, 11.2.3	
1.2.2	4.4, Clause 10, Clause 11, 16.3	
1.2.3	7.3.1, 7.5, 9.2.3.2, 9.3.1	
1.2.4.1	9.2.2, 9.2.3.3	
1.2.4.2	9.2.2, 9.2.3.3, 9.2.3.6, 9.4	
1.2.4.3	9.2.3.4.2, 10.7	
1.2.4.4	9.2.3.3, 9.2.3.4.2	
1.2.5	9.2.3.5	
1.2.6	5.4, 7.5	
1.5.1	All	
1.5.4	13.4.5(d), Clause 17	
1.5.5	7.4, 16.2.2	
1.6.3	5.3, 10.8	
1.6.4	Clause 11	
1.7.1.	Clause 16, Clause 17	
1.7.1.1	Clause 16, Clause 17	
1.7.1.2	10.1.1, 10.3, 10.4, Clause 16	
1.7.2	Clause 16, Clause 17	
1.7.4.2 (e,g, i,j,m,p,r,s,t)	Clause 17	
1.7.4.2 u, 1.5.8		These essential requirements are specifically excluded as noise has not been considered

Essential Requirements of Directive 2006/42/EC	Clause(s) / sub-clause(s) of this EN	Remarks / Notes
		during the development of the standard
1.5.10, 1.5.11		These essential requirements have been excluded as the electromagnetic compliance information only gives methods that have proved useful and are supplied as guidance.

**WARNING 1** — Presumption of conformity stays valid only as long as a reference to this European Standard is maintained in the list published in the Official Journal of the European Union. Users of this standard should consult frequently the latest list published in the Official Journal of the European Union.

**WARNING 2** — Other Union legislation may be applicable to the product(s) falling within the scope of this standard.

## Annex ZZB (informative)

### Relationship between this European Standard and the safety objectives of Directive 2014/35/EU [2014 OJ L96] aimed to be covered

This European standard has been prepared under a Commission's standardization request relating to harmonised standards in the field of the Low Voltage Directive, M/511, to provide one voluntary means of conforming to safety objectives of Directive 2014/35/EU of the European Parliament and of the Council of 26 February 2014 on the harmonization of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits [2014 OJ L96].

Once this standard is cited in the Official Journal of the European Union under that Directive, compliance with the normative clauses of this standard given in Table ZZB.1 confers, within the limits of the scope of this standard, a presumption of conformity with the corresponding safety objectives of that Directive, and associated EFTA regulations.

**Table ZZB.1 – Correspondence between this European Standard and Annex I of Directive 2014/35/EU [2014 OJ L96]**

Safety objectives of Directive 2014/35/EU	Clause(s) / sub-clause(s) of this EN	Remarks/note
1 a)	Clause 16, 5.1, 5.2, 5.3, 5.6, 6.2, 8.2, 8.3, 10.2, 10.8, 11.1, 11.2, 13.1, 13.2	
1 b)	4.2, 5.3, 5.5, 6.2, 6.2.4, 7.2, 7.2.2, 8.2, 9.2, , 11.2, Clause 12, 13, 13.4.4, 13.4.5, 14.4, Clause 15, Clause 17, Clause 18	
1 c)	<i>Introduction</i> , 1, 3, 11.1, 11.2	Refer to 2a) to 2d) and 3a) to 3c)in this table
2 a)	4.1, 4.2, Clause 5, Clause 6, 7.1, 7.2, 7.7, 7.8, 7.10, Clause 8, Clause 9, 11.3, 11.4, Clause 12, 13.2, Clause 15, Clause 16, Clause 18, Annex A	
2 b)	Clause 4, 4.4.3, 4.5, 7.2, 7.3, 7.4, 7.9, 7.10, 11.2.3, 11.4, Clause 12, 13.1.4, 14.4, 14.5, 16.2.2	For electromagnetic fields, this standard does not provide performance requirements for either immunity or emissions. Only general advice is given. EMF is not covered. Ionizing radiation is not considered.
2 c)	4.1, 4.4.8, 5.3, 5.4, 5.5, 5.6, 7.5, 7.6, Clause 9, Clause 10, 13.1, Clause 14, 15.2	Noise is not considered in this standard. Functional safety is not fully covered. Explosion of batteries has not been covered by this standard. Optical radiation is not covered.
2 d)	6.2.3, 6.3, 6.4, 7.2.7, 9.4, Clause 12, 13.3, 13.4.3, 13.5,	

Safety objectives of Directive 2014/35/EU	Clause(s) / sub-clause(s) of this EN	Remarks/note
	14.4, Clause 18	
3 a)	6.2.2, 6.2.3, 8.2.1, 8.2.2, 8.2.3, 11.4, 12.2, 12.3, 12.6.1, 12.6.2, 13.3, 13.4, 13.5, 14.2 14.6	The standard only considers the mechanical requirements for electrical parts of a machine.
3 b)	4.6, 6.2.3, 10.1.3, 11.3, 11.4, 12.7.6	For EMC, this standard does not provide performance requirements for either immunity or emissions. Only general advice is given Hazard associated with EMC and functional safety are not covered. Safety-related security is not covered
3 c)	3, Clause 7, Clause 8, 9.2, 11.4, 14.6, 15.1	

**WARNING 1** — Presumption of conformity stays valid only as long as a reference to this European Standard is maintained in the list published in the Official Journal of the European Union. Users of this standard should consult frequently the latest list published in the Official Journal of the European Union.

**WARNING 2** — Other Union legislation may be applicable to the product(s) falling within the scope of this standard.

## 11 Modification to Bibliography

Add the following notes for the standards indicated:

IEC 60034-5	NOTE	Harmonized as EN 60034-5.
IEC 60034-11	NOTE	Harmonized as EN 60034-11.
IEC 60038:2009	NOTE	Harmonized as EN 60038:2011 (modified).
IEC 60073:2002	NOTE	Harmonized as EN 60073:2002 (not modified).
IEC 60085	NOTE	Harmonized as EN 60085.
IEC 60204-11:2000	NOTE	Harmonized as EN 60204-11:2000 (not modified).
IEC 60204-31:2013	NOTE	Harmonized as EN 60204-31:2013 (not modified).
IEC 60204-32:2008	NOTE	Harmonized as EN 60204-32:2008 (not modified).
IEC 60204-33:2009	NOTE	Harmonized as EN 60204-33:2011 (modified).
IEC 60216	NOTE	Harmonized in EN 60216 series.
IEC 60228:2004	NOTE	Harmonized as EN 60228:2005 (not modified).
IEC 60269-1:2006	NOTE	Harmonized as EN 60269-1:2007 (not modified).
IEC 60320-1	NOTE	Harmonized as EN 60320-1.
IEC 60332	NOTE	Harmonized in EN 60332 series.
IEC 60335	NOTE	Harmonized in EN 60335 series.
IEC 60364	NOTE	Harmonized in HD 60364 series.
IEC 60447:2004	NOTE	Harmonized as EN 60447:2004 (not modified).
IEC 60757:1983	NOTE	Harmonized as HD 457 S1:1985 (not modified).
IEC TR 60890	NOTE	Harmonized as CLC/TR 60890.
IEC 60909-0:2001	NOTE	Harmonized as EN 60909-0:2001 (not modified).
IEC 60947-1:2007	NOTE	Harmonized as EN 60947-1:2007 (not modified).
IEC 60947-4-1	NOTE	Harmonized as EN 60947-4-1.
IEC 60947-5-2:2007	NOTE	Harmonized as EN 60947-5-2:2007 (not modified).
IEC 60947-5-8	NOTE	Harmonized as EN 60947-5-8.
IEC 60947-7-1:2009	NOTE	Harmonized as EN 60947-7-1:2009 (not modified).
IEC 61000-6-1:2005	NOTE	Harmonized as EN 61000-6-1:2007 (not modified).
IEC 61000-6-2:2005	NOTE	Harmonized as EN 61000-6-2:2005 (not modified).
IEC 61000-6-3:2006	NOTE	Harmonized as EN 61000-6-3:2007 (not modified).

IEC 61000-6-4:1997	NOTE	Harmonized as EN 61000-6-4:2001 <sup>5)</sup> (modified).
IEC 61082-1:2014	NOTE	Harmonized as EN 61082-1:2015 (not modified).
IEC 61175	NOTE	Harmonized as EN 61175.
IEC 61180	NOTE	Harmonized in EN 61180 series.
IEC 61496-1:2004	NOTE	Harmonized as EN 61496-1:2004 <sup>6)</sup> (modified).
IEC 61557	NOTE	Harmonized in EN 61557 series.
IEC 61558-2-2	NOTE	Harmonized as EN 61558-2-2.
IEC 61558-2-16	NOTE	Harmonized as EN 61558-2-16.
IEC 61643-12:2008	NOTE	Harmonized as CLC/TS 61643-12:2009 (modified).
IEC 61666	NOTE	Harmonized as EN 61666.
IEC 61800	NOTE	Harmonized in EN 61800 series.
IEC 62020	NOTE	Harmonized as EN 62020.
IEC 62027:2011	NOTE	Harmonized as EN 62027:2012 (not modified).
IEC 62305-1:2010	NOTE	Harmonized as EN 62305-1:2011 (modified).
IEC 62305-4:2010	NOTE	Harmonized as EN 62305-4:2011 (modified).
IEC 62491	NOTE	Harmonized as EN 62491.
IEC 62507-1	NOTE	Harmonized as EN 62507-1.
IEC 62745	NOTE	Harmonized as EN 62745.
IEC 81346-1:2009	NOTE	Harmonized as EN 81346-1:2009 (not modified).
IEC 81346-2:2009	NOTE	Harmonized as EN 81346-2:2009 (not modified).
IEC 82079-1:2012	NOTE	Harmonized as EN 82079-1:2012 (not modified).
ISO 12100:2010	NOTE	Harmonized as EN ISO 12100:2010 (not modified).
ISO 13732-1	NOTE	Harmonized as EN ISO 13732-1.

<sup>5)</sup> Superseded by EN 61000-6-4:2007, which is based on IEC 61000-6-4:2006.

<sup>6)</sup> Superseded by EN 61496-1:2013, which is based on IEC 61496-1:2012.



