

STN	Systémy elektrických výkonových pohonov s nastaviteľnou rýchlosťou Časť 3: Požiadavky na elektromagnetickú kompatibilitu (EMC) a špecifické skúšobné metódy	STN EN IEC 61800-3 35 1720
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Adjustable speed electrical power drive systems - Part 3: EMC requirements and specific test methods

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**Adjustable speed electrical power drive systems - Part 3: EMC
requirements and specific test methods
(IEC 61800-3:2017)**

Entraînements électriques de puissance à vitesse variable -
Partie 3: Exigences de CEM et méthodes d'essais
spécifiques
(IEC 61800-3:2017)

Drehzahlveränderbare elektrische Antriebssysteme - Teil 3:
EMV-Anforderungen einschließlich spezieller Prüfverfahren
(IEC 61800-3:2017)

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EN IEC 61800-3:2018 (E)**European foreword**

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This document supersedes EN 61800-3:2004 and EN 61800-3:2004/A1:2012.

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In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 60038:2009	NOTE	Harmonized as EN 60038:2011 (modified).
IEC 60065	NOTE	Harmonized as EN 60065.
IEC 60146-1-3:1991	NOTE	Harmonized as EN 60146-1-3:1993 (not modified).
IEC 60146-2:1999	NOTE	Harmonized as EN 60146-2:2000 (not modified).
IEC 60364-1:2005	NOTE	Harmonized as HD 60364-1:2008 (modified).
IEC 60664-1:2007	NOTE	Harmonized as HD 60664-1:2007 (not modified).
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IEC 61000-6-2:2016	NOTE	Harmonized as EN 61000-6-2:2017 (not modified).
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IEC 61000-6-5:2015	NOTE	Harmonized as EN 61000-6-5:2015 (not modified).
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IEC 61557-9	NOTE	Harmonized as EN 61557-9.
IEC 61800-1:1997	NOTE	Harmonized as EN 61800-1:1998 (not modified).
IEC 61800-2:2015	NOTE	Harmonized as EN 61800-2:2015 (not modified).
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IEC 61800-5-1:2007	NOTE	Harmonized as EN 61800-5-1:2007 (not modified).
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CISPR 16-2-3:2016	NOTE	Harmonized as EN 55016-2-3:2017 (not modified).

EN IEC 61800-3:2018 (E)**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.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60146-1-1	2009	Semiconductor converters - General requirements and line commutated converters -- Part 1-1: Specification of basic requirements	EN 60146-1-1	2010
IEC 61000-2-2	2002	Electromagnetic compatibility (EMC) -- Part 2-2: Environment - Compatibility levels for low-frequency conducted disturbances and signalling in public low-voltage power supply systems	EN 61000-2-2	2002
IEC 61000-2-4	2002	Electromagnetic compatibility (EMC) -- Part 2-4: Environment - Compatibility levels in industrial plants for low-frequency conducted disturbances	EN 61000-2-4	2002
IEC 61000-3-2	2014	Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current - 16 A per phase)	EN 61000-3-2	2014
IEC 61000-3-3	2013	Electromagnetic compatibility (EMC) - Part 3-3: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current - 16 A per phase and not subject to conditional connection	EN 61000-3-3	2013
IEC 61000-3-11	2000	Electromagnetic compatibility (EMC) -- Part 3-11: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems - Equipment with rated current ≤ 75 A and subject to conditional connection	EN 61000-3-11	2000

IEC 61000-3-12	2011	Electromagnetic compatibility (EMC) -- Part 3-12: Limits - Limits for harmonic currents produced by equipment connected to public low-voltage systems with input current > 16 A and ≤ 75 A per phase	EN 61000-3-12	2011
IEC 61000-4-2	2008	Electromagnetic compatibility (EMC) -- Part 4-2: Testing and measurement techniques - Electrostatic discharge immunity test	EN 61000-4-2	2009
IEC 61000-4-3	2006	Electromagnetic compatibility (EMC) -- Part 4-3: Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test	EN 61000-4-3	2006
IEC 61000-4-4	2012	Electromagnetic compatibility (EMC) -- Part 4-4: Testing and measurement techniques - Electrical fast transient/burst immunity test	EN 61000-4-4	2012
IEC 61000-4-5	2014	Electromagnetic compatibility (EMC) - Part 4-5: Testing and measurement techniques - Surge immunity test	EN 61000-4-5	2014
IEC 61000-4-6	2013	Electromagnetic compatibility (EMC) -- Part 4-6: Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields	EN 61000-4-6	2014
IEC 61000-4-8	2009	Electromagnetic compatibility (EMC) -- Part 4-8: Testing and measurement techniques - Power frequency magnetic field immunity test	EN 61000-4-8	2010
IEC 61000-4-11	2004	Electromagnetic compatibility (EMC) -- Part 4-11: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations immunity tests	EN 61000-4-11	2004
IEC 61000-4-13	2002	Electromagnetic compatibility (EMC) -- Part 4-13: Testing and measurement techniques - Harmonics and interharmonics including mains signaling at a.c. power port, low frequency immunity tests	EN 61000-4-13	2002
IEC 61000-4-34	2005	Electromagnetic compatibility (EMC) -- Part 4-34: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations immunity tests for equipment with input current more than 16 A per phase	EN 61000-4-34	2007
CISPR 11 (mod)	2015	Industrial, scientific and medical equipment - Radio-frequency disturbance characteristics - Limits and methods of measurement	EN 55011	2016
+ A1	2016		+ A1	2017

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CISPR 16-1-2	2014	Specification for radio disturbance and immunity measuring apparatus and methods - Part 1-2: Radio disturbance and immunity measuring apparatus - Coupling devices for conducted disturbance measurements	EN 55016-1-2	2014
CISPR 16-1-4	2010	Specification for radio disturbance and immunity measuring apparatus and methods -- Part 1-4: Radio disturbance and immunity measuring apparatus - Antennas and test sites for radiated disturbance measurements	EN 55016-1-4	2010
CISPR 22	-	Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement	-	-
CISPR 32	2015	Electromagnetic compatibility of multimedia equipment - Emission requirements	EN 55032	2015



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**Adjustable speed electrical power drive systems –
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INTERNATIONAL STANDARD

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CONTENTS

FOREWORD	7
1 Scope	9
2 Normative references	10
3 Terms and definitions	12
3.1 Installation and its content	12
3.2 Intended use	13
3.3 Location, ports and interfaces	14
3.4 Components of the PDS	17
3.5 Phenomena-related definitions	18
4 Common requirements	19
4.1 General conditions	19
4.2 Tests	20
4.2.1 Conditions	20
4.2.2 Test report	20
4.3 Documentation for the user	21
5 Immunity requirements	22
5.1 General conditions	22
5.1.1 Acceptance criteria (performance criteria)	22
5.1.2 Selection of performance type	22
5.1.3 Conditions during the test	24
5.2 Basic immunity requirements – low-frequency disturbances	25
5.2.1 Common principle	25
5.2.2 Harmonics and commutation notches/voltage distortion	25
5.2.3 Voltage deviations, dips and short interruptions	27
5.2.4 Voltage unbalance and frequency variations	30
5.2.5 Supply influences – Magnetic fields	31
5.3 Basic immunity requirements – High-frequency disturbances	32
5.3.1 Conditions	32
5.3.2 First environment	32
5.3.3 Second environment	33
5.3.4 Immunity against electromagnetic fields	35
5.4 Application of immunity requirements – Statistical aspect	35
6 Emission	35
6.1 General emission requirements	35
6.2 Basic low-frequency emission limits	37
6.2.1 Compliance method	37
6.2.2 Commutation notches	37
6.2.3 Harmonics and interharmonics	37
6.2.4 Voltage fluctuations	38
6.2.5 Emissions in the frequency range from 2 kHz to 9 kHz	39
6.2.6 Common mode harmonic emission (low-frequency common mode voltage)	39
6.3 Conditions related to high-frequency emission measurement	39
6.3.1 General requirements	39
6.3.2 Connection requirements	44

6.4	Basic high-frequency emission limits.....	44
6.4.1	Equipment of categories C1 and C2.....	44
6.4.2	Equipment of category C3	47
6.5	Engineering practice	48
6.5.1	PDS of category C4	48
6.5.2	Limits outside the boundary of an installation, for a PDS of category C4 – Example of propagation of disturbances	49
6.6	Application of emission requirements – Statistical aspects.....	52
Annex A (informative)	EMC techniques	53
A.1	Application of PDSs and EMC	53
A.2	Load conditions regarding high-frequency phenomena.....	53
A.2.1	Load conditions during emission tests	53
A.2.2	Load conditions during immunity tests	54
A.2.3	Load test	54
A.3	Immunity to power frequency magnetic fields	54
A.4	High-frequency emission measurement techniques	54
A.4.1	Impedance/artificial mains network (AMN)	54
A.4.2	Performing high-frequency in situ emission tests	56
A.4.3	Established experience with high power PDSs.....	56
Annex B (informative)	Low-frequency phenomena	57
B.1	Commutation notches	57
B.1.1	Occurrence – description	57
B.1.2	Calculation	59
B.1.3	Recommendations regarding commutation notches	60
B.2	Definitions related to harmonics and interharmonics	61
B.2.1	General discussion	61
B.2.2	Phenomena related definitions.....	62
B.2.3	Conditions of application.....	64
B.3	Application of harmonic emission standards.....	68
B.3.1	General	68
B.3.2	Public networks	69
B.3.3	Summation methods for harmonics in an installation – Practical rules.....	73
B.4	Installation rules – Assessment of harmonic compatibility	75
B.4.1	Low power industrial three-phase system	75
B.4.2	Large industrial system.....	78
B.4.3	Interharmonics and voltages or currents at higher frequencies	80
B.5	Voltage unbalance	80
B.5.1	Origin	80
B.5.2	Definition and assessment.....	81
B.5.3	Effect on PDSs	83
B.6	Voltage dips – Voltage fluctuations	83
B.6.1	Voltage dips	83
B.6.2	Voltage fluctuation.....	85
B.7	Verification of immunity to low frequency disturbances.....	86
Annex C (informative)	Reactive power compensation – Filtering	87
C.1	Installation	87
C.1.1	Usual operation	87
C.1.2	Power definitions under distorted conditions	87

C.1.3	Practical solutions	88
C.1.4	Reactive power compensation	89
C.1.5	Filtering methods	93
C.2	Reactive power and harmonics	95
C.2.1	Usual installation mitigation methods	95
C.2.2	Other solutions	97
Annex D (informative)	Considerations on high-frequency emission	101
D.1	User guidelines	101
D.1.1	Expected emission of PDSs	101
D.1.2	Guidelines	103
D.2	Safety and RFI-filtering in power supply systems	105
D.2.1	Safety and leakage currents	105
D.2.2	Safety and RFI-filtering in power supply systems isolated from earth	105
Annex E (informative)	EMC analysis and EMC plan for PDS of category C4	107
E.1	General – System EMC analysis applied to PDSs	107
E.1.1	Electromagnetic environment	107
E.1.2	System EMC analysis techniques	108
E.2	Example of EMC plan	109
E.2.1	Project data and description	109
E.2.2	Electromagnetic environment analysis	110
E.2.3	EMC analysis	111
E.2.4	Establishment of installation rules	111
E.2.5	Formal result and maintenance	113
E.3	Example of supplement to EMC plan for particular application	113
E.3.1	Electromagnetic environment complementary analysis	113
E.3.2	EMC analysis	115
Bibliography	117
Figure 1	– Installation and its content	12
Figure 2	– Internal interfaces of the PDS and examples of ports	15
Figure 3	– Power interfaces of a PDS with common DC BUS	16
Figure 4	– Power interfaces with common input transformer	17
Figure 5	– Example for a typical cable arrangement for measurements in 3 m separation distance, for a table-top or wall-mounted equipment, top view	43
Figure 6	– Example for a typical cable arrangement for measurements in 3 m separation distance for a table-top or wall-mounted equipment, side view	43
Figure 7	– Example for a typical test set up for measurement of conducted and/or radiated disturbances from a floor-standing PDS, 3D view	44
Figure 8	– Propagation of disturbances	50
Figure 9	– Propagation of disturbances in installation with a PDS rated > 1 000 V	50
Figure B.1	– Typical waveform of commutation notches – Distinction from non-repetitive transient	57
Figure B.2	– PCC, IPC, installation current ratio and R_{SI}	67
Figure B.3	– PCC, IPC, installation current ratio and R_{SC}	68
Figure B.4	– Assessment of the harmonic emission of a PDS	70
Figure B.5	– Test set-up with mechanical load	71
Figure B.6	– Test set-up with electrical load replacing the loaded motor	72

Figure B.7 – Test set-up with resistive load.....	72
Figure B.8 – Assessment of harmonic emission where PDS is used (apparatus, systems or installations)	77
Figure C.1 – Reactive power compensation	90
Figure C.2 – Simplified diagram of an industrial network.....	92
Figure C.3 – Impedance versus frequency of the simplified network.....	92
Figure C.4 – Example of passive filter battery	94
Figure C.5 – Example of inadequate solution in reactive power compensation	96
Figure C.6 – VSI PWM active filter topologies	98
Figure C.7 – Boost mode converter.....	98
Figure C.8 – Front-End inverter system.....	99
Figure D.1 – Conducted emission of various unfiltered PDSs	102
Figure D.2 – Expected radiated emission of PDS up to rated voltage 400 V Peak values normalised at 10 m	103
Figure D.3 – Safety and filtering.....	106
Figure E.1 – Interaction between systems and EM environment.....	107
Figure E.2 – Zone concept.....	108
Figure E.3 – Example of drive	109
Table 1 – Subclauses containing alternative test methods	21
Table 2 – Criteria to prove the acceptance of a PDS against electromagnetic disturbances	24
Table 3 – Minimum immunity requirements for total harmonic distortion on power ports of low voltage PDSs.....	26
Table 4 – Minimum immunity requirements for individual harmonic orders on power ports of low voltage PDSs.....	26
Table 5 – Minimum immunity requirements for commutation notches on power ports of low voltage PDSs.....	27
Table 6 – Minimum immunity requirements for harmonics and commutation notches/voltage distortion on main power ports of PDSs of rated voltage above 1 000 V.....	27
Table 7 – Minimum immunity requirements for voltage deviations, dips and short interruptions on power ports of low voltage PDSs	28
Table 8 – Minimum immunity requirements for voltage deviations, dips and short interruptions on main power ports of rated voltage above 1 000 V of PDSs.....	29
Table 9 – Minimum immunity requirements for voltage deviations, dips and short interruptions on auxiliary low voltage power ports of PDSs	30
Table 10 – Minimum immunity requirements for voltage unbalance and frequency variations on power ports of low voltage PDSs.....	30
Table 11 – Minimum immunity requirements for voltage unbalance and frequency variations on main power ports of rated voltage above 1 000 V of PDSs	31
Table 12 – Minimum immunity requirements for voltage unbalance and frequency variations on auxiliary low voltage power ports of PDSs.....	31
Table 13 – Minimum immunity requirements for PDSs intended for use in the first environment.....	32
Table 14 – Minimum immunity requirements for PDSs intended for use in the second environment.....	34
Table 15 – Summary of emission requirements	36

Table 16 – Limits for mains terminal disturbance voltage in the frequency band 150 kHz to 30 MHz	45
Table 17 – Limits for electromagnetic radiation disturbance in the frequency band 30 MHz to 1 000 MHz	46
Table 18 – Limits of disturbance voltage on the power interface.....	46
Table 19 – Limits for mains terminal disturbance voltage in the frequency band 150 kHz to 30 MHz for a PDS in the second environment – PDS of category C3	47
Table 20 – Limits for electromagnetic radiation disturbance in the frequency band 30 MHz to 1 000 MHz for a PDS in the second environment – PDS of category C3.....	48
Table 21 – Limits for propagated disturbance voltage ("outside" in the first environment)	51
Table 22 – Limits for propagated disturbance voltage ("outside" in the second environment).....	51
Table 23 – Limits for propagated electromagnetic disturbance above 30 MHz.....	51
Table 24 – Limits for electromagnetic disturbance below 30 MHz.....	52
Table B.1 – Maximum allowable depth of commutation notches at the PC.....	60
Table B.2 – Harmonic current emission requirements relative to the total current of the agreed power at the PCC or IPC.....	79
Table B.3 – Verification plan for immunity to low frequency disturbances	86
Table E.1 – EM interaction between subsystems and environment.....	109
Table E.2 – Frequency analysis	115

INTERNATIONAL ELECTROTECHNICAL COMMISSION

**ADJUSTABLE SPEED ELECTRICAL POWER
DRIVE SYSTEMS –****Part 3: EMC requirements and specific test methods**

FOREWORD

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International Standard IEC 61800-3 has been prepared by subcommittee 22G: Adjustable speed electric drive systems incorporating semiconductor power converters, of IEC technical committee 22: Power electronic systems and equipment.

This third edition cancels and replaces the second edition published in 2004 and Amendment 1:2011. This edition constitutes a technical revision.

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

- a) clarification of requirements for the test report, particularly when a number of alternative test methods exist;
- b) introduction of a more detailed test setup for radiated emission measurements, along with the introduction of a 3 m measurement distance for small size equipment;
- c) general updates in the informative annexes.

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

FDIS	Report on voting
22G/347/FDIS	22G/350/RVD

Full information on the voting for the approval of this International 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, and with IEC Guide 107.

A list of all parts in the IEC 61800 series, published under the general title *Adjustable speed electrical power drive systems*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "<http://webstore.iec.ch>" in the data related to the specific document. At this date, the document 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 publication using a colour printer.

ADJUSTABLE SPEED ELECTRICAL POWER DRIVE SYSTEMS –

Part 3: EMC requirements and specific test methods

1 Scope

This part of IEC 61800 specifies electromagnetic compatibility (EMC) requirements for power drive systems (PDSs, defined in 3.1). These are adjustable speed AC or DC motor drives. Requirements are stated for PDSs with converter input and/or output voltages (line-to-line voltage), up to 35 kV AC RMS.

PDSs covered by this document are those installed in residential, commercial and industrial locations with the exception of traction applications, and electric vehicles. PDSs can be connected to either industrial or public power distribution networks. Industrial networks are supplied by a dedicated distribution transformer, which is usually adjacent to or inside the industrial location, and supplies only industrial customers. Industrial networks can also be supplied by their own electric generating equipment. On the other hand, PDSs can be directly connected to low-voltage public mains networks which also supply residential premises, and in which the neutral is generally earthed (grounded).

The scope of this part of IEC 61800, related to EMC, includes a broad range of PDSs from a few hundred watts to hundreds of megawatts. PDSs are often included in a larger system. The system aspect is not covered by this document but guidance is provided in the informative annexes.

The requirements have been selected so as to ensure EMC for PDSs at residential, commercial and industrial locations. The requirements cannot, however, cover extreme cases which can occur with an extremely low probability. Changes in the EMC behaviour of a PDS, as a result of fault conditions, are not taken into account.

The object of this document is to define the limits and test methods for a PDS according to its intended use. This document includes immunity requirements and requirements for electromagnetic emissions.

NOTE 1 Emission can cause interference in other electronic equipment (for example radio receivers, measuring and computing devices). Immunity is meant to protect the equipment from continuous and transient conducted and radiated disturbances including electrostatic discharges. The emission and immunity requirements are balanced against each other and against the actual environment of the PDS.

This document defines the minimum EMC requirements for a PDS.

Immunity requirements are given according to the environment classification. Low-frequency emission requirements are given according to the nature of the supply network. High-frequency emission requirements are given according to four categories of intended use, which cover both environment and bringing into operation.

As a product standard, this document can be used for the assessment of PDS. It can also be used for the assessment of complete drive modules (CDM) or basic drive modules (BDM) (see 3.1), which can be marketed separately.

This document contains

- conformity assessment requirements for products to be placed on the market, and

- recommended engineering practice (see 6.5) for cases where high frequency emissions cannot be measured before the equipment is placed on the market (such PDSs are defined in 3.2.7 as category C4).

NOTE 2 The first edition of IEC 61800-3 identified that the intended use could require engineering for putting into service. This was done by the “restricted distribution mode”. Equipment formerly identified under “restricted distribution mode” is now covered by categories C2 and C4 (see 3.2).

This document is intended as a complete EMC product standard for the EMC conformity assessment of products of categories C1, C2 and C3, when placing them on the market (see definitions 3.2.4 to 3.2.6).

Radio frequency emission of equipment of category C4 is only assessed when it is installed in its intended location. It is therefore treated as a fixed installation, for which this document gives rules of engineering practice in 6.5 and Annex E, although it gives no defined emission limits (except in case of complaint).

This document does not specify any safety requirements for the equipment such as protection against electric shocks, insulation co-ordination and related dielectric tests, unsafe operation, or unsafe consequences of a failure. It also does not cover safety and functional safety implications of electromagnetic phenomena.

In special cases, when highly susceptible apparatus is being used in proximity, additional mitigation measures can have to be employed to reduce the electromagnetic emission further below the specified levels or additional countermeasures can have to be employed to increase the immunity of the highly susceptible apparatus.

As an EMC product standard for PDSs, this document takes precedence over all aspects of the generic standards, and no additional EMC tests are performed. If a PDS is included as part of equipment covered by a separate EMC product standard, the EMC standard of the complete equipment applies.

2 Normative references

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.

IEC 60146-1-1:2009, *Semiconductor convertors – General requirements and line commutated convertors – Part 1-1: Specifications of basic requirements*

IEC 61000-2-2:2002, *Electromagnetic compatibility (EMC) – Part 2-2: Environment – Compatibility levels for low-frequency conducted disturbances and signalling in public low-voltage power supply systems*

IEC 61000-2-4:2002, *Electromagnetic compatibility (EMC) – Part 2-4: Environment – Compatibility levels in industrial plants for low-frequency conducted disturbances*

IEC 61000-3-2:2014, *Electromagnetic compatibility (EMC) – Part 3-2: Limits – Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)*

IEC 61000-3-3:2013, *Electromagnetic compatibility (EMC) – Part 3-3: Limits – Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤ 16 A per phase and not subject to conditional connection*

IEC 61000-3-11:2000, *Electromagnetic compatibility (EMC) – Part 3-11: Limits – Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems – Equipment with rated current ≤ 75 A and subject to conditional connection*

IEC 61000-3-12: 2011, *Electromagnetic compatibility (EMC) – Part 3-12: Limits – Limits for harmonic currents produced by equipment connected to public low-voltage systems with input current > 16 A and ≤ 75 A per phase*

IEC 61000-4-2:2008, *Electromagnetic compatibility (EMC) – Part 4-2: Testing and measurement techniques – Electrostatic discharge immunity test*

IEC 61000-4-3:2006, *Electromagnetic compatibility (EMC) – Part 4-3: Testing and measurement techniques – Radiated, radio-frequency, electromagnetic field immunity test*

IEC 61000-4-4:2012, *Electromagnetic compatibility (EMC) – Part 4-4: Testing and measurement techniques – Electrical fast transient/burst immunity test*

IEC 61000-4-5:2014, *Electromagnetic compatibility (EMC) – Part 4-5: Testing and measurement techniques – Surge immunity test*

IEC 61000-4-6:2013, *Electromagnetic compatibility (EMC) – Part 4-6: Testing and measurement techniques – Immunity to conducted disturbances, induced by radio-frequency fields*

IEC 61000-4-8:2009, *Electromagnetic compatibility (EMC) – Part 4-8: Testing and measurement techniques – Power frequency magnetic field immunity test*

IEC 61000-4-11:2004, *Electromagnetic compatibility (EMC) – Part 4-11: Testing and measurement techniques – Voltage dips, short interruptions and voltage variations immunity tests*

IEC 61000-4-13:2002, *Electromagnetic compatibility (EMC) – Part 4-13: Testing and measurement techniques – Harmonics and interharmonics including mains signalling at a.c. power port, low frequency immunity tests*

IEC 61000-4-34:2005, *Electromagnetic compatibility (EMC) – Part 4-34: Testing and measurement techniques – Voltage dips, short interruptions and voltage variations immunity tests for equipment with input current more than 16 A per phase*

CISPR 11:2015, *Industrial, scientific and medical equipment – Radio-frequency disturbance characteristics – Limits and methods of measurement*
CISPR 11:2015/AMD1:2016

CISPR 16-1-2:2014, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 1-2: Radio disturbance and immunity measuring apparatus – Coupling devices for conducted disturbance measurements*

CISPR 16-1-4:2010, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 1-4: Radio disturbance and immunity measuring apparatus – Antennas and test sites for radiated disturbance measurements*

CISPR 22, *Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement*

CISPR 32:2015, *Electromagnetic compatibility of multimedia equipment – Emission requirements*

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