SLOVENSKI STANDARD
SIST EN 50065-2-3:2024

01-september-2024

Nadomešča:
SIST EN 50065-2-3:2004
SIST EN 50065-2-3:2004/A1:2006

Signalizacija po vodnikih nizkonapetostnih električnih inštalacij v frekvenčnem območju od 3 kHz do 148,5 kHz – 2-3. del: Zahteve za odpornost omrežne komunikacijske opreme, ki obratuje v frekvenčnem območju od 3 kHz do 95 kHz in je namenjena za uporabo prii dobaviteljih električne energije in distributerjih

Signalling on low-voltage electrical installations in the frequency range 3 kHz to 148,5 kHz - Part 2-3: Immunity requirements for mains communicating equipment operating in the range of frequencies 3 kHz to 95 kHz and intended for use by electricity suppliers and distributors

Signalübertragung auf elektrischen Niederspannungsnetzen im Frequenzbereich 3 kHz bis 148,5 kHz - Teil 2-3: Störfestigkeitsanforderungen an Netz-Datenübertragungsgeräte, die im Frequenzbereich 3 kHz bis 95 kHz betrieben werden und für den Gebrauch durch Stromversorgungs- und verteilungsunternehmen bestimmt sind

Transmission de signaux sur les réseaux électriques basse tension dans la bande de fréquences de 3 kHz à 148,5 kHz - Partie 2-3 : Exigences d’immunité pour les appareils de communication par le réseau électrique dans la bande de fréquences de 3 kHz à 95 kHz et destinés à être utilisés par les fournisseurs et les distributeurs d’énergie électrique

Ta slovenski standard je istoveten z: **EN 50065-2-3:2024**

ICS:

33.040.30	Komutacijski in signalizacijski sistem	Switching and signalling systems
33.100.20	Imunost	Immunity

SIST EN 50065-2-3:2024 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 50065-2-3

July 2024

ICS 33.040.30; 33.100.01

Supersedes EN 50065-2-3:2003/corrigendum Aug. 2003;
EN 50065-2-3:2003; EN 50065-2-3:2003/A1:2005

English Version

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

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Ref. No. EN 50065-2-3:2024 E

Contents

Page

European foreword

This document (EN 50065-2-3:2024) has been prepared by WG 11 “Immunity” of CLC/TC 219 “Mains communicating systems”.

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)	2025–06–03
• latest date by which the national standards conflicting with this document have to be withdrawn	(dow)	2027–06–03

This document supersedes EN 50065-2-3:2003 and all of its amendments and corrigenda (if any).

EN 50065-2-3:2024 includes the following significant technical changes with respect to EN 50065-2-3:2003:

— adaptation of title as well as generally focussing on mains communicating equipment (MCE);

— adaptation of the Scope precising clarifying the applicability of the standard;

— completion and update of normative references;

— completion of Definitions;

— update of the Performance criteria;

— update of the Test specifications;

— improvement of the test circuit and method used for immunity tests, in the normative Annex A, considering also problems at testing immunity from voltage dips and voltage interruptions having been recognized at application of the test circuit defined in EN 50065-2-3:2003;

— addition of an Annex B (informative) with optional test specifications.

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.

Any feedback and questions on this document should be directed to the users’ national committee. A complete listing of these bodies can be found on the CENELEC website.

Introduction

This document defines limits and test methods for the immunity of mains communicating equipment (MCE) operating in the range of frequencies from 3 kHz to 95 kHz and intended for monitoring or controlling the low-voltage (LV) distribution network, including energy usage of connected equipment and premises, used by electricity suppliers and distributors (e.g. Distribution System Operators (DSOs)).

Immunity requirements for MCE intended for operation in residential, commercial and light industrial environments are given in Part 2-1 of the EN 50065-2 series.

Immunity requirements and tests applicable to MCE intended for operation in industrial environments are given in Part 2-2 of the EN 50065-2 series.

For MCE intended to be operated by utilities in the frequency range 3 kHz to 95 kHz, with lower immunity requirements than specified in this Part 2-3, the specifications of Part 2-2 or Part 2-1 of the EN 50065-2 series may be applied.

These tests and limits represent essential electromagnetic compatibility (EMC) and immunity requirements for the environment according to the scope. Not all known disturbances have been included for testing purposes which have been limited to those disturbances known to be critical for the operation of such equipment including specific MCE disturbances such as conducted narrow band.

The immunity requirements have been selected to ensure an adequate level of immunity for MCE for use by electricity utilities. The levels do not however cover extreme cases which could occur in any location but with an extremely low probability of occurrence.

Annexes designated “normative” are part of the body of the standard.

In this document, Annex A is normative, and Annex B is informative.

1 Scope

This document applies to electrical equipment using signals in the frequency range 3 kHz to 95 kHz to transmit or receive information on low voltage electrical systems, for electricity suppliers and distributors.

Mains communicating equipment (MCE) may fall into one of the two following categories:

— MCE implementing transmission or reception of information on LV distribution networks or installations of network users connected to the public electricity distribution network as the sole function. Immunity requirements for such equipment are entirely covered by this document;

— MCE being equipment covered by the scope of other standards, integrating mains communication as one of their functions. In this case, only the immunity requirements for the mains communication function of such equipment are covered by the scope of this document. Immunity requirements for all other available functions of this equipment are covered by the relevant product standard or generic standard.

The object of this document is to contribute to ensuring EMC in general. It specifies essential immunity requirements and test methods, including those tests which are to be performed during type-testing of MCE, for electromagnetic interference (EMI) generated on LV installations.

It defines the methods and requirements for testing immunity of MCE on meeting the essential requirements of the EMCD. Test requirements are specified for each port considered.

Furthermore, it provides guidelines for the assessment of the performance of the communication function of an MCE. Normative specifications are under consideration.

This document gives immunity requirements which are applicable to MCE used by electricity suppliers and distributors (e.g. DSOs) for purposes like energy management and network monitoring and automation. The levels do not however cover extreme cases which could occur in any location but with a low probability of occurrence. In special cases situations will arise where the level of disturbances could exceed the levels specified in this document, e.g. where a hand-held transmitter is used in proximity of an apparatus. In these instances special mitigation measures might have to be employed.

It does not specify immunity of MCE to signals from other MCE operating in the same nominal frequency band or immunity to signals originating from power line carrier systems operating on high or medium-voltage networks.

Safety considerations are not included in this document.

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.

EN 50065-1:2011, *Signalling on low-voltage electrical installations in the frequency range 3 kHz to 148,5 kHz - Part 1: General requirements, frequency bands and electromagnetic disturbances*

EN 61000-4-2:2009, *Electromagnetic compatibility (EMC) - Part 4-2: Testing and measurement techniques - Electrostatic discharge immunity test* (IEC 61000-4-2:2008)

EN 61000-4-3:2020, *Electromagnetic compatibility (EMC) - Part 4-3: Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test (IEC 61000-4-3:2020)*

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

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

EN 61000-4-5:2014/A1:2017, *Electromagnetic compatibility (EMC) - Part 4-5: Testing and measurement techniques - Surge immunity test (IEC 61000-4-5:2014/AMD1:2017)*

EN 61000-4-6:2014, *Electromagnetic compatibility (EMC) - Part 4-6: Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields* (IEC 61000-4-6:2013)

EN 61000-4-6:2014/AC:2015, *Electromagnetic compatibility (EMC) - Part 4-6: Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields (IEC 61000-4-6:2013/COR1:2015)*

EN 61000-4-8:2010, *Electromagnetic compatibility (EMC) - Part 4-8: Testing and measurement techniques - Power frequency magnetic field immunity test* (IEC 61000-4-8:2009)

EN IEC 61000-4-11:2020, *Electromagnetic compatibility (EMC) - Part 4-11: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations immunity tests for equipment with input current up to 16 A per phase* (IEC 61000-4-11:2020)

EN IEC 61000-4-11:2020/AC:2020-06, *Electromagnetic compatibility (EMC) - Part 4-11: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations immunity tests for equipment with input current up to 16 A per phase* (IEC 61000-4-11:2020/COR1:2020)

EN 61000-4-19:2014, *Electromagnetic compatibility (EMC) - Part 4-19: Testing and measurement techniques - Test for immunity to conducted, differential mode disturbances and signalling in the frequency range 2 kHz to 150 kHz at a.c. power ports* (IEC 61000-4-19:2014)

EN IEC 61000-4-20:2022, *Electromagnetic compatibility (EMC) - Part 4-20: Testing and measurement techniques - Emission and immunity testing in transverse electromagnetic (TEM) waveguides* (IEC 61000-4-20:2022)

EN 61000-4-21:2011, *Electromagnetic compatibility (EMC) - Part 4-21: Testing and measurement techniques - Reverberation chamber test methods* (IEC 61000-4-21:2011)

EN 61000-4-22:2011, *Electromagnetic compatibility (EMC) - Part 4-22: Testing and measurement techniques - Radiated emission and immunity measurements in fully anechoic rooms (FARs)* (IEC 61000-4-22:2010)

EN 61000-4-29:2000, *Electromagnetic compatibility (EMC) - Part 4-29: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations on d.c. input power port immunity tests* (IEC 61000-4-29:2000)

3 Terms, definitions and abbreviations

For the purposes of this document, the following terms, definitions and abbreviations apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1 Terms and definitions

3.1.1
mains communicating equipment
MCE
electrical equipment using mains power lines either on the public electricity distribution network or within installations of network users connected to the public electricity distribution network, for transmission and reception of information signals

3.1.2
mains communicating system
MCS
electrical system using mains power lines to transmit information signals, either on the public electricity distribution network or within installations of network users

[SOURCE: EN 61000-2-2:2002/A1:2017, definition 3.1.8]

3.1.3
signal
physical phenomenon whose presence, absence or variation is considered as representing information

[SOURCE: IEC 60050, definition 171-01-03]

3.1.4
(mains) signalling (voltage)
signal superimposed on the voltage for the purpose of transmission of information in electrical power system and to users' premises

[SOURCE: IEC 60050, definition 614-01-35]

3.1.5
electromagnetic compatibility
EMC
ability of equipment or a system to function satisfactorily in its electromagnetic environment without introducing intolerable electromagnetic disturbances to anything in that environment

[SOURCE: IEC 60050, definitions 161-01-07, 702-08-66]

3.1.6
electromagnetic disturbance
any electromagnetic phenomenon which can degrade the performance of a device, equipment or system, or adversely affect living or inert matter

Note 1 to entry: An electromagnetic disturbance can be an electromagnetic noise, an unwanted signal or a change in the propagation medium itself.

[SOURCE: IEC 60050, definitions 161-01-05, 702-08-04]

3.1.7
electromagnetic interference
EMI
degradation of the performance of an equipment, transmission channel or system caused by an electromagnetic disturbance

[SOURCE: IEC 60050, definitions 161-01-06, 702-08-29]

3.1.8
immunity
<to a disturbance> ability of an MCE to perform within specified limits in the presence of an electromagnetic disturbance

3.1.9
port
particular interface of the specified accessory with the external electromagnetic environment

Note 1 to entry: See Figure 1.

[SOURCE: IEC 60050, definition 131-12-60, modified – reference to MCE only, addition of a figure]

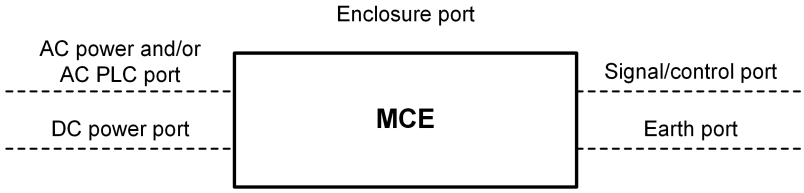

Figure 1 — Examples of ports

3.1.10
enclosure port
physical boundary of the MCE through which electromagnetic fields can radiate or impinge

[SOURCE: IEC 60050, definition 445-07-04, modified – reference to MCE (instead of time relay)]

3.1.11
immunity test level
level of a test signal used to simulate an electromagnetic disturbance when performing an immunity test

[SOURCE: IEC 60050, definition 161-04-41]

3.1.12
stimulus
auxiliary equipment to be used during the tests for exercising the PLC communication together with the EUT

3.1.13
nominal frequency band
band used by an MCE or a mains communicating system (MCS), to be specified in the MCE product declaration, which includes the transmit frequency band(s) of an MCE determined according to EN 50065-1:2011, 6.2.1, and frequency intervals adjacent to the transmit frequency band(s)

Note 1 to entry: In some cases, the nominal frequency band could be also fragmented allowing for notching of frequency ranges used by other MCS.

3.1.14
block error ratio
BLER
ratio of the number of erroneous blocks received (EB) to the total number of correct blocks (TB) sent during a given time interval

$$\mathrm{BLER} = \frac{\mathrm{EB}}{\mathrm{TB}}$$

Note 1 to entry: Here, the term “block” means a datagram used by a service primitive (e.g. request/response, see Clause A.2) in the layered architecture based on the OSI Reference model.

[SOURCE: IEC 60050, definition 721-08-13, modified – Addition of a note]